5/13

DART AEROSPACE LTD	Work Order:	22527
Description: Arm	Part Number:	D3387-041
Dwg: D3387 Rev. A	Qty:	40
		Page 1 of 1

Step	Location	Procedure	By	Date	Qty
1	DC	Issue Traveler		05.02.23	40
2	MV	Cut blank: 6.000" x 0.500" x 17.800" long M16991 M16953 Material: 6061-T6/T651 (QQ-A-200/8) (M6061T6B0.500x06.000) **Identify for D3387-1** Batch: M16764		05.02.24	40
3	MV	Machine as per Folio FA511 and Dwg D3387 **Identify as D3387-1**	JL	07-3-05	40
4	MV	C'sink Ø0.375" as per Dwg D3387		05.03.05	40
5	QC2	Inspect parts as they come off the CNC machine	JL	07-3-05	40
6	QC8	Second check		05/03/07	40
7	MV	Tumble and Deburr **NO** sharp edges	JL	05-03-07	40
8	QC5	Inspect work to Step 7		05/03/07	40
9	FP	Chemical Conversion Coat as per QSI 005 4.1			
10	QC3	Inspect Chemical Conversion Coat			
11	GA	Press spacer into D3387-1 arm as per Dwg D3387 **Pick:** Qty / Part Number / Description / Batch 1 D2808 Spacer			
12	QC5	Inspect work to Step 11			
13	ST	Identify and Stock		05.03.05	40
14	AC	Cost / part: 29.75		05.03.09	40
15	DC	Close W/O 29.75 Inspect Level 21		05/09/19	40

Rev	Date	Change	Revised By	Approved
A	05.02.22	New Issue	KJ/JLM	

RELEASED 5/10/23

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Mfg / Design Mgr	**Approval** QC Inspector

NCR:		WORK ORDER NON-CONFORMANCE (NCR)							
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Design Mgr	**Approval** QC Inspector
			Initial Design Mgr	**Action Description** Design Mgr	**Sign & Date**			
05-07-03	3	- 1 part is under tol. by 0.005" on 2.000 dim. should be $2.000^{+0.01}_{-0.005}$ reading 1.990".	[redacted] GP	PART IS ACCEPTABLE. MARGIN IS STILL POSITIVE.		[redacted]	[redacted] 05.08.12	[redacted]

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes (No) **DQA:** [redacted] **Date:** 05/09/19

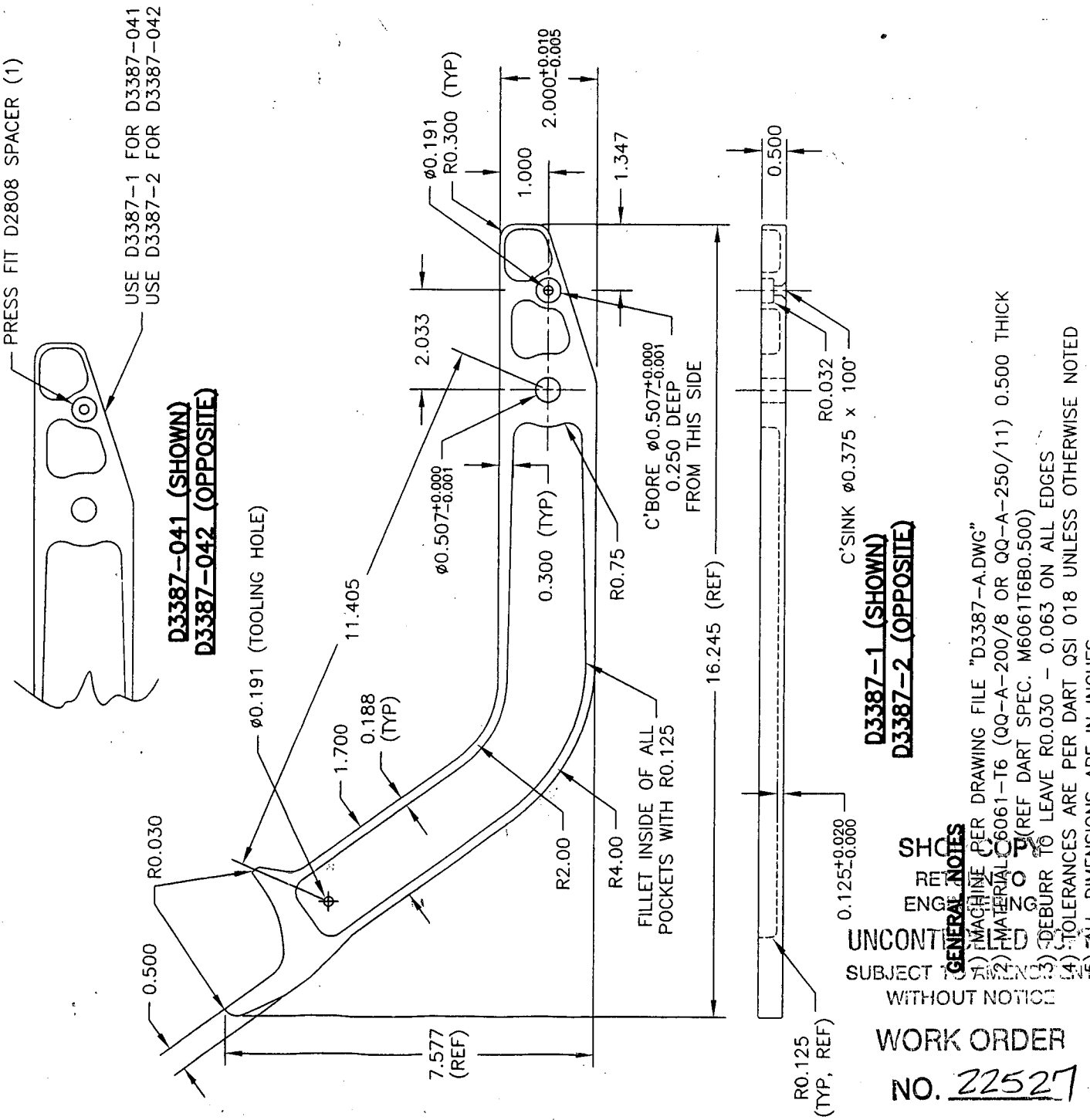
NOTE: Date & initial all entries **QA: N/C Closed:** _____ **Date:** _____

H:\forms\Quality Assurance\approved forms\NCRWO revC

PRELIMINARY ISSUE

DESIGN	DRAWN BY	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA
CHECKED	APPROVED	DRAWING NO. D3387 — REV. A — SHEET 1 OF 1
DATE 05.01.18		TITLE ARM — SCALE 1:3

A	05.01.18	NEW ISSUE



GENERAL NOTES
1) MACHINE PER DRAWING FILE "D3387-A.DWG"
2) MATERIAL: 6061-T6 (QQ-A-200/8 OR QQ-A-250/11) 0.500 THICK
3) FINISH: 63 (REF DART SPEC. M6061T6B0.500)
4) DEBURR TO LEAVE R0.030 – 0.063 ON ALL EDGES
5) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED
6) ALL DIMENSIONS ARE IN INCHES

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WORK ORDER
NO. 22527

Job Costing Report

Dart Aerospace Ltd.
Hawkesbury

Feb 22, 2005
03:39 pm

Work Order No	: 0022527		
Project Name	: D3387-041	Department Code:	
Project For	: WK513	Burden Flags	: NNNNNNN
Work Order Type	: Main	WO Status	: Open
Main WO Number	:	Invoice State	: Not Invoiced
House Part Number	: D3387-041	Invoice Date	:
Description	: Arm Assembly	Invoice Number	:
Manufactured	: No	Invoice Amount	: 0.00
Amount Req'd	: 0		
Amount Done	: 0	Order Entry No	:
Start Date	: 02-22-05	OE Value	: 0.00
Est Finish Date	: 03-15-05		
Act Finish Date	:	Est Margin	: 0.000%
Drawings Reqd	: No	Actual Margin	: 0.000%
Ok for Approval	:		
Approval Rec'd	:	$0 Posted to Finished Goods	

	Estimated	Actual	Var. %	Posted	To Post
Material Cost	0.00	0.00	0.00	0.00	0.00
Engineering Hours	0.00	0.00	0.00		
Engineering Cost	0.00	0.00	0.00	0.00	0.00
Production Hours	0.00	0.00	0.00		
Production Cost	0.00	0.00	0.00	0.00	0.00
Packaging Hours	0.00	0.00	0.00		
Packaging Cost	0.00	0.00	0.00	0.00	0.00
OverHead Hours	0.00	0.00	0.00		
OverHead Cost	0.00	0.00	0.00	0.00	0.00
CNC Hours	0.00	0.00	0.00		
CNC	0.00	0.00	0.00	0.00	0.00
Misc. Hours	0.00	0.00	0.00		
Misc.	0.00	0.00	0.00	0.00	0.00
Burden	0.00	0.00	0.00		
Total Cost	0.00	0.00	0.00		
Margin	0.000	0.000			
Selling Cost	0.00	0.00			

	Estimated	Actual
Labour Hrs/Amount Done	0.00	0.00
Profits/(Loss)	0.00	0.00

DART AEROSPACE LTD	Work Order:	22527
Description: ARM	Part Number:	D3387-1
Inspection Dwg: D3387 Rev: A		Page 1 of 1

FIRST ARTICLE INSPECTION CHECKLIST

[X] First Article [ ] Prototype

Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
0.500	±.010	0.505	✓		Vern	
R0.032	±.010	R0.032	✓		~~Vern~~ R-G	
Ø0.375 X 100°	±.010	Ø0.380 X 100°	✓		Vern	
0.125	+.020 −.000	0.145	✓		Vern	
R0.125	±.016	R0.125	✓		R-G	
1.347	±.005	1.347	✓		Vern	
2.000	+.010 −.005	2.001	✓		Vern	
1.000	±.005	1.000	✓		Vern	
Ø0.191	+.005 −.000	Ø0.192	✓		Vern	
2.033	±.005	2.038	✓		Vern	
Ø0.507	+.000 −.001	Ø0.5065	✓		Vern	
0.306	±.010	0.305	✓		Vern	
0.188	±.010	0.195	✓		Vern	
1.700	±.010	1.700	✓		Vern	
0.500	±.016	0.502	✓		Vern	

Measured by:	ML	Audited by:	E	Prototype Approval:	N/A
Date:	05/02/25	Date:	25.03.05	Date:	

Rev	Date	Change	Revised by	Approved
A		New Issue	KJ/JLM	

FROM SR-P577-1 RevA
Page 13

05.08.12

6.2 D3387-1/-2 ARM

The D3387-1/-2 arms are used in the D412-630-023/-024 steps. The maximum load in this part corresponds to R84L =R155L determined in section 4.1 of this report. Refer to Figure 6 in Appendix D for the geometry involved in this analysis. For each critical section shown in Figure 6, the D3387-1/-2 arms are checked for bending failure.

Geometry

$x1 := 12.19 \cdot in$ $xa := 11.64 \cdot in$ $\theta a := 35.77 \cdot deg$

$x2 := 1.99 \cdot in$ $xb := 0.95 \cdot in$

$xc := 0.60 \cdot in$

$xd := 6.21 \cdot in$

Loads

$F := R84L$	$F = 765 \cdot mass$	Applied load
$Mmax := F \cdot x1$	$Mmax = 9325 \cdot lb \cdot in$	Maximum bending moment
$Fs := \frac{Mmax}{x2}$	$Fs = 4686 \cdot mass$	Load applied to the stop
$Fpy := F + Fs \cdot \sin(\theta a)$	$Fpy = 3504 \cdot mass$	Vertical load at the pivot
$Fpx := Fs \cdot \cos(\theta a)$	$Fpx = 3802 \cdot mass$	Horizontal load at the pivot
$Fp := \sqrt{Fpy^2 + Fpx^2}$	$Fp = 5171 \cdot mass$	Total pivot load

Section A-A Analysis

$H := 1.99 \cdot in$ $t := 0.125 \cdot in$ $w := 0.50 \cdot in$ $h := 0.295 \cdot in$ Section A-A parameters

$I := \frac{t \cdot H^3}{12} + 2 \cdot \left[\frac{(w - t) \cdot h^3}{12} + (w - t) \cdot h \cdot \left(\frac{H}{2} - \frac{h}{2} \right)^2 \right]$ $I = 0.243 \cdot in^4$ Inertia at Section A-A

$Ma := \frac{xa}{x1} \cdot Mmax$ $Ma = 8905 \cdot lb \cdot in$ Moment at Section A-A

$\sigma a := \frac{Ma \cdot H}{2 \cdot I}$ $\sigma a = 36520 \cdot psi$ Stress at Section A-A

$MS23a := \frac{Ftu}{\sigma a} - 1$ $MS23a = 0.04$ Margin of Safety at Section A-A

Section B-B Analysis

$H := 1.744 \cdot in$ $t := 0.125 \cdot in$ $w := 0.50 \cdot in$ $h := 0.25 \cdot in$ Section B-B parameters

$I := \frac{t \cdot H^3}{12} + 2 \cdot \left[\frac{(w - t) \cdot h^3}{12} + (w - t) \cdot h \cdot \left(\frac{H}{2} - \frac{h}{2} \right)^2 \right]$ $I = 0.161 \cdot in^4$ Inertia at Section B-B

$Mb := \frac{xb}{x2} \cdot Mmax$ $Mb = 4452 \cdot lb \cdot in$ Moment at Section B-B

$\sigma b := \frac{Mb \cdot H}{2 \cdot I}$ $\sigma b = 24133 \cdot psi$ Stress at Section B-B

$MS23b := \frac{Fcy}{\sigma b} - 1$ $MS23b = 0.409$ Margin of Safety at Section B-B